

**TABLE 1**

IHA antibody titers against *Pasteurella haemolytica* serotype 1 and leukotoxin neutralization titers before and after vaccination. First dose of vaccine on day 0, 2<sup>nd</sup> dose on day 21. All animals intratracheally challenged with wild-type serotype 1 on day 28. (n=6 for controls and 5 each for vaccinated groups)

		Day -3	Day 21	Day 28	Day 33
IHA titer	SubQ vaccinate	2.6	3.4	4.8	5.8
	Oral vaccinate	3.0	7.6	7.0	7.6
	Control	2.2	3.3	3.5	5.8*
Leukotoxin	SubQ vaccinate	6.8	6.8	7.4	7.8
	Oral vaccinate	6.6	7.8	7.4	8.0
	Control	6.8	6.3	6.2	6.8*

\*Four surviving calves, 2 animals died 3 days after challenge and were not tested.